

CLAIMS

What is claimed is:

1. A composition having improved adherence with an addition-curable material, said composition comprising:
 - a resin component that is organic and polymeric and free of ethylenically unsaturated and silicon hydride functional groups; and
 - an additive incorporated into said resin component and selected from the group of a fluorine-substituted organopolysiloxane, an amino-functional organopolysiloxane, an unsaturated carboxylic acid or carboxylic acid salt, and combinations thereof, wherein said additive comprises a hydrosilylation reactive group for reaction with the addition-curable material.
2. A composition as set forth in claim 1 wherein said hydrosilylation reactive group of said additive comprises an ethylenically unsaturated functional group for reaction with the addition-curable material.
3. A composition as set forth in claim 2 wherein said additive comprises said fluorine-substituted organopolysiloxane.
4. A composition as set forth in claim 3 wherein said fluorine-substituted organopolysiloxane comprises a copolymer of organosiloxanes.
5. A composition as set forth in claim 3 wherein said fluorine-substituted organopolysiloxane is copolymerized with an organic block selected from the group of polyamide blocks, polyester blocks, polyolefin blocks, fluorine-substituted organic polymer blocks, polyurea blocks, poly(phenylene ether) blocks, syndiotactic polystyrene blocks, and combinations thereof.
6. A composition as set forth in claim 3 wherein said fluorine-substituted organopolysiloxane includes fluorinated hydrocarbon groups selected from the group of 3,3,3-trifluoropropyl; 6,6,6,5,5,4,4,3,3-nonafluorohexyl; and combinations thereof.
7. A composition as set forth in claim 3 wherein said fluorine-substituted organopolysiloxane comprises dimethylvinylsiloxy-terminated methyl 3,3,3-trifluoropropyl siloxane.

8. A composition as set forth in claim 2 wherein said additive comprises said amino-functional organopolysiloxane.

9. A composition as set forth in claim 8 wherein said amino-functional organopolysiloxane comprises a copolymer of organosiloxanes.

10. A composition as set forth in claim 8 wherein said amino-functional organopolysiloxane is copolymerized with an organic block selected from the group of polyamide blocks, polyester blocks, polyolefin blocks, fluorine-substituted organic polymer blocks, polyurea blocks, poly(phenylene ether) blocks, syndiotactic polystyrene blocks, and combinations thereof.

11. A composition as set forth in claim 8 wherein said amino-functional organopolysiloxane comprises an amine-terminated random copolymer of dimethylsiloxane and methylvinylsiloxane.

12. A composition as set forth in claim 2 wherein said additive comprises said unsaturated carboxylic acid or carboxylic acid salt.

13. A composition as set forth in claim 12 wherein said unsaturated carboxylic acid or carboxylic acid salt is copolymerized or grafted with an unsaturated organic block selected from the group of polyamide blocks, polyester blocks, polysiloxane blocks, polyolefin blocks, fluorine-substituted organic polymer blocks, polyurea blocks, poly(phenylene ether) blocks, syndiotactic polystyrene blocks, and combinations thereof.

14. A composition as set forth in claim 12 wherein said unsaturated carboxylic acid or carboxylic acid salt is selected from the group of 10-undecenoic acid, zinc undecylenate, sodium undecylenate, magnesium undecylenate, calcium undecylenate, lithium undecylenate, potassium undecylenate, lead undecylenate, functionalized stearates having unsaturation at the first carbon atom in the chain, functionalized montanates having unsaturation at the first carbon atom in the chain, and combinations thereof.

15. A composition as set forth in claim 1 wherein said hydrosilylation reactive group of said additive comprises a silicon hydride functional group for reaction with the addition-curable material.

16. A composition as set forth in claim 15 wherein said additive comprises said fluorine-substituted organopolysiloxane and said fluorine-substituted organopolysiloxane comprises a fluorine-substituted organohydrogenpolysiloxane.

17. A composition as set forth in claim 16 wherein said fluorine-substituted organohydrogenpolysiloxane comprises a copolymer of organohydrogenpolysiloxanes and organopolysiloxanes.

18. A composition as set forth in claim 16 wherein said fluorine-substituted organohydrogenpolysiloxane is copolymerized with an organic block selected from the group of polyamide blocks, polyester blocks, polyolefin blocks, fluorine-substituted organic polymer blocks, polyurea blocks, poly(phenylene ether) blocks, syndiotactic polystyrene blocks, and combinations thereof.

19. A composition as set forth in claim 16 wherein said fluorine-substituted organohydrogenpolysiloxane includes fluorinated hydrocarbon groups selected from the group of 3,3,3-trifluoropropyl; 6,6,6,5,5,4,4,3,3-nonafluorohexyl; and combinations thereof.

20. A composition as set forth in claim 16 wherein said fluorine-substituted organohydrogenpolysiloxane comprises trimethylsiloxy-terminated poly(methylhydrogensiloxane/methyl-6,6,6,5,5,4,4,3,3-nonafluorohexylsiloxane).

21. A composition as set forth in claim 1 further comprising a compatibilizing agent for compatibilizing said resin component and said additive, wherein said compatibilizing agent comprises an organic segment compounded with said additive.

22. A composition as set forth in claim 1 further comprising a catalyst selected from the group of hydrosilylation catalysts, activators for free radical initiators, and combinations thereof.

23. A composition as set forth in claim 1 wherein said additive is present in an amount of from 0.001 to 30 parts by weight based on 100 parts by weight of said resin component.

24. A composition as set forth in claim 1 wherein said resin component is further defined as a polymer derived from a monomer or monomers selected from the

group of styrene, substituted styrenes, diamines, diacids, lactams, diols, olefin, substituted olefin, dienes, diisocyanate, epoxide, phenol, substituted phenols, ketones, substituted ketones, aldehydes, substituted aldehydes, acrylates, methacrylates, acrylic acid, fumaric acid, maleic acid, maleic anhydride, carbon dioxide, and combinations thereof.

25. A composition as set forth in claim 1 wherein said resin component is further defined as a polymer selected from the group of polystyrenes, polyamides, polycarbonates, polyolefins, styrene acrylonitriles, acrylonitrile-butadiene-styrenes, polyesters, polyurethanes, epoxies, polyphenylene oxides, halogen-substituted organic polymers, polyphthalamides, polyphenylene sulfides, liquid crystalline polymer, polycyclohexaneterephthalates, and combinations thereof.

26. A composition as set forth in claim 1 wherein said resin component is selected from the group of atactic polystyrene, isotactic polystyrene, syndiotactic polystyrene, nylon 6, nylon 6,6, polyethylene terephthalate, polybutylene terephthalate, polyethylene, polypropylene, polytetrafluoroethylene, cyanate esters, bismaleimide triazine, and combinations thereof.

27. A composite article comprising:

at least one substrate;

an addition-curable material disposed on said at least one substrate;

wherein said at least one substrate is formed from a composition reactive with said addition-curable material, said composition comprising:

a resin component that is organic and polymeric and free of ethylenically unsaturated and silicon hydride functional groups; and

an additive incorporated into said resin component and selected from the group of a fluorine-substituted organopolysiloxane, an amino-functional organopolysiloxane, an unsaturated carboxylic acid or carboxylic acid salt, and combinations thereof, wherein said additive comprises a hydrosilylation reactive group present at a surface of said at least one substrate for reaction with said addition-curable material to improve adherence of said at least one substrate with said addition-curable material.

28. A composite article as set forth in claim 27 wherein said addition-curable material comprises a hydrosilylation-curable material.

29. A composite article as set forth in claim 27 wherein said hydrosilylation reactive group of said additive comprises an ethylenically unsaturated functional group for reaction with the addition-curable material.

30. A composite article as set forth in claim 29 wherein said additive comprises said fluorine-substituted organopolysiloxane.

31. A composite article as set forth in claim 30 wherein said fluorine-substituted organopolysiloxane comprises a copolymer of organosiloxanes.

32. A composite article as set forth in claim 30 wherein said fluorine-substituted organopolysiloxane is copolymerized with an organic block selected from the group of polyamide blocks, polyester blocks, polyolefin blocks, fluorine-substituted organic polymer blocks, polyurea blocks, poly(phenylene ether) blocks, syndiotactic polystyrene blocks, and combinations thereof.

33. A composite article as set forth in claim 30 wherein said fluorine-substituted organopolysiloxane includes fluorinated hydrocarbon groups selected from the group of 3,3,3-trifluoropropyl; 6,6,6,5,5,4,4,3,3-nonafluorohexyl; and combinations thereof.

34. A composite article as set forth in claim 30 wherein said fluorine-substituted organopolysiloxane comprises dimethylvinylsiloxy-terminated methyl 3,3,3-trifluoropropyl siloxane.

35. A composite article as set forth in claim 29 wherein said additive comprises said amino-functional organopolysiloxane.

36. A composite article as set forth in claim 35 wherein said amino-functional organopolysiloxane comprises a copolymer of organosiloxanes.

37. A composite article as set forth in claim 35 wherein said amino-functional organopolysiloxane is copolymerized with an organic block selected from the group of polyamide blocks, polyester blocks, polyolefin blocks, fluorine-substituted organic polymer blocks, polyurea blocks, poly(phenylene ether) blocks, syndiotactic polystyrene blocks, and combinations thereof.

38. A composite article as set forth in claim 35 wherein said amino-functional organopolysiloxane comprises an amine-terminated random copolymer of dimethylsiloxane and methylvinylsiloxane.

39. A composite article as set forth in claim 29 wherein said additive comprises said unsaturated carboxylic acid or carboxylic acid salt.

40. A composite article as set forth in claim 39 wherein said unsaturated carboxylic acid or carboxylic acid salt is copolymerized or grafted with an unsaturated organic block selected from the group of polyamide blocks, polyester blocks, polysiloxane blocks, polyolefin blocks, fluorine-substituted organic polymer blocks, polyurea blocks, poly(phenylene ether) blocks, syndiotactic polystyrene blocks, and combinations thereof.

41. A composite article as set forth in claim 39 wherein said unsaturated carboxylic acid or carboxylic acid salt is selected from the group of 10-undecenoic acid, zinc undecylenate, sodium undecylenate, magnesium undecylenate, calcium undecylenate, lithium undecylenate, potassium undecylenate, lead undecylenate, functionalized stearates having unsaturation at the first carbon atom in the chain, functionalized montanates having unsaturation at the first carbon atom in the chain, and combinations thereof.

42. A composite article as set forth in claim 27 wherein said hydrosilylation reactive group of said additive comprises a silicon hydride functional group for reaction with the addition-curable material.

43. A composite article as set forth in claim 42 wherein said additive comprises said fluorine-substituted organopolysiloxane and said fluorine-substituted organopolysiloxane comprises a fluorine-substituted organohydrogenpolysiloxane.

44. A composite article as set forth in claim 43 wherein said fluorine-substituted organohydrogenpolysiloxane comprises a copolymer of organohydrogenpolysiloxanes and organopolysiloxanes.

45. A composite article as set forth in claim 43 wherein said fluorine-substituted organohydrogenpolysiloxane is copolymerized with an organic block selected from the group of polyamide blocks, polyester blocks, polyolefin blocks,

fluorine-substituted organic polymer blocks, polyurea blocks, poly(phenylene ether) blocks, syndiotactic polystyrene blocks, and combinations thereof.

46. A composite article as set forth in claim 43 wherein said fluorine-substituted organohydrogenpolysiloxane includes fluorinated hydrocarbon groups selected from the group of 3,3,3-trifluoropropyl; 6,6,6,5,5,4,4,3,3-nonafluorohexyl; and combinations thereof.

47. A composite article as set forth in claim 43 wherein said fluorine-substituted organohydrogenpolysiloxane comprises trimethylsiloxy-terminated poly (methylhydrogensiloxane/methyl-6,6,6,5,5,4,4,3,3-nonafluorohexylsiloxane).

48. A composite article as set forth in claim 27 further comprising a compatibilizing agent for compatibilizing said resin component and said additive, wherein said compatibilizing agent comprises an organic segment compounded with said additive.

49. A composite article as set forth in claim 27 further comprising a catalyst selected from the group of hydrosilylation catalysts, activators for free radical initiators, and combinations thereof.

50. A composite article as set forth in claim 27 wherein said additive is present in an amount of from 0.001 to 30 parts by weight based on 100 parts by weight of said resin component.

51. A composite article as set forth in claim 27 wherein said resin component is further defined as a polymer derived from a monomer or monomers selected from the group of styrene, substituted styrenes, diamines, diacids, lactams, diols, olefin, substituted olefin, dienes, diisocyanate, epoxide, phenol, substituted phenols, ketones, substituted ketones, aldehydes, substituted aldehydes, acrylates, methacrylates, acrylic acid, fumaric acid, maleic acid, maleic anhydride, carbon dioxide, and combinations thereof.

52. A composite article as set forth in claim 27 wherein said resin component is further defined as a polymer selected from the group of polystyrenes, polyamides, polycarbonates, polyolefins, styrene acrylonitriles, acrylonitrile-butadiene-styrenes, polyesters, polyurethanes, epoxies, polyphenylene oxides, halogen-substituted

organic polymers, polyphthalamides, polyphenylene sulfides, liquid crystalline polymer, polycyclohexaneterephthalates, and combinations thereof.

53. A composite article as set forth in claim 27 wherein said resin component is selected from the group of atactic polystyrene, isotactic polystyrene, syndiotactic polystyrene, nylon 6, nylon 6,6, polyethylene terephthalate, polybutylene terephthalate, polyethylene, polypropylene, polytetrafluoroethylene, cyanate esters, bismaleimide triazine, and combinations thereof.